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THE EFFECT OF SUBJECTIVE PROBABILITY OF SUCCESS,
AND SUCCESS AND FAILURE ON TASK RESUMPTION

by



GERI LYNN STEWART

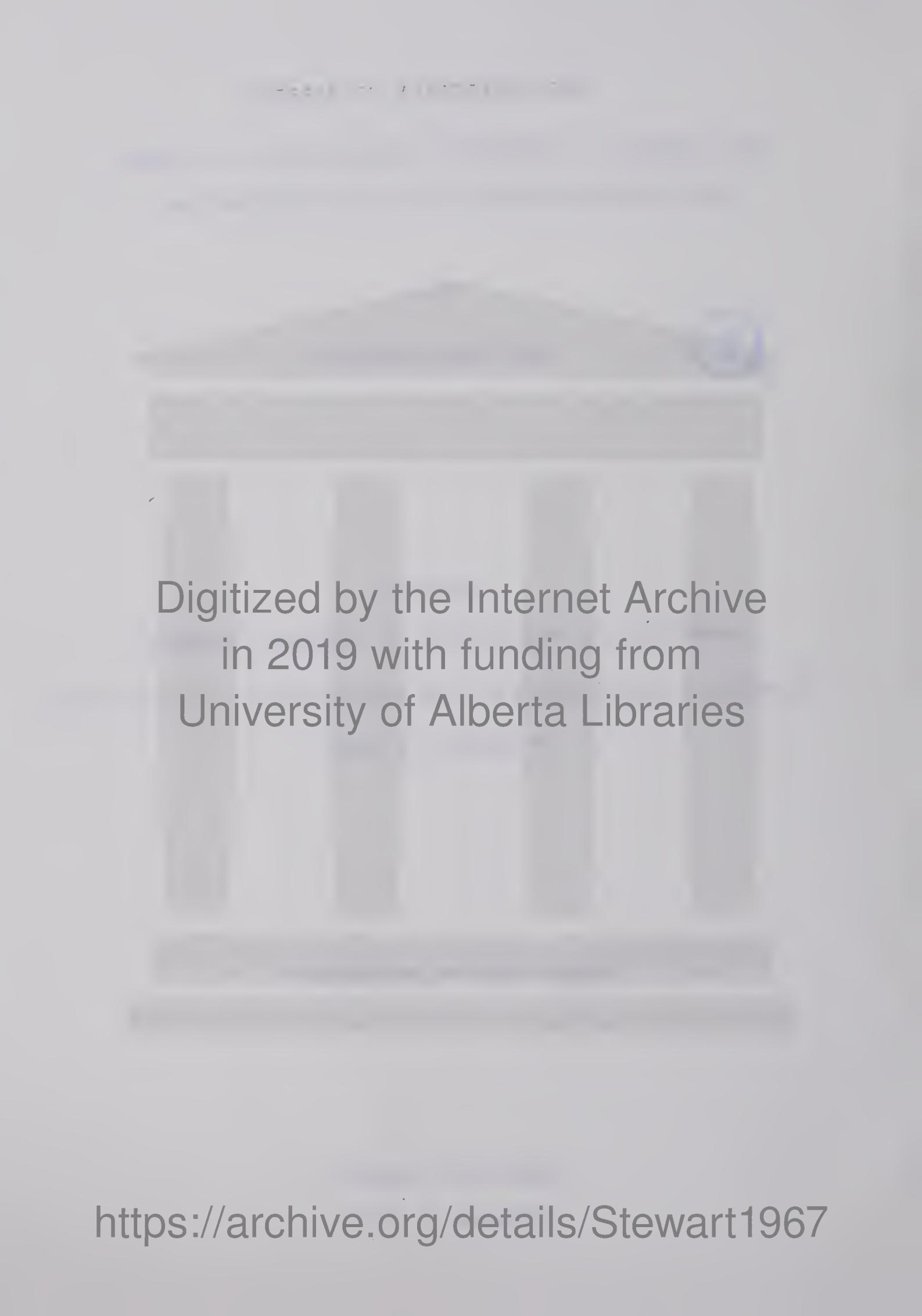
A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE
OF MASTER OF ARTS

DEPARTMENT OF PSYCHOLOGY

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The undersigned certify that they have read, and
recommend to the Faculty of Graduate Studies for acceptance,
a thesis entitled "The Effect of Subjective Probability of
Success, and Success and Failure on Task Resumption", sub-
mitted by Geri Lynn Stewart in partial fulfillment of the
requirements for the degree of Master of Arts.

ABSTRACT

Two independent studies were undertaken to test predictions concerning resumption of tasks following induced success and failure experiences. Predictions for both studies were derived from a theory of achievement motivation formulated by J.W. Atkinson. Ss for Study I were selected on the basis of their scores on a probability-of-success questionnaire which required Ss to estimate their chances of success in several task situations.

It was predicted that, in a forced-choice situation, Ss with high questionnaire scores (high expectancies of success) would tend to resume the task on which they had just experienced failure rather than the task on which they had just experienced success. It was further predicted that Ss with low expectancies of success would tend to resume the task on which they had just experienced success.

The results obtained for Study I revealed that almost all Ss chose to resume the task on which they had succeeded. This lack of variability in resumption choices made a clear-cut interpretation of the results impossible: the results could be regarded as negative evidence for Atkinson's theory, on the one hand, or the findings could be considered in terms of some methodological defect in the present study, on the

other hand.

The latter possibility was regarded as the most plausible one. In order to establish a general difficulty level for the experimental task among the Study I Ss, the instructions to Ss had included references to the performance level attained by a high-ability norm group on the same task. It was felt that this use of a high ability norm group may have obliterated the anticipated effect of success and failure upon Ss' expectancies of success.

In an attempt to clarify this possibility, three different norm groups of varying ability levels were used in Study II. It was expected that Ss working under conditions in which a low-ability norm group was used, would tend to have initially high expectancies of success for the experimental task. It was further expected that Ss working under a high-ability norm group would tend to have initially low expectancies of success. It was predicted that Ss working under the high-ability norm group would tend to resume the success task in a forced-choice situation, while Ss working under a low-ability norm group would tend to resume the failure task.

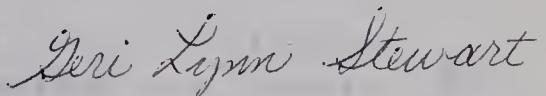
Resumption choices made by these Ss did not, however, support the predictions. Nearly all Ss chose to resume the task on which they had experienced success.

The lack of expected findings in both Studies I and II were discussed in terms of several other possible methodological defects. Perhaps the most plausible explanation of the results centers around the ego-involvement variable; the possibility that Ss were not ego-involved in these two studies appears likely. If Ss were not ego-involved, then derivations from Atkinson's theory were not tested in these two studies.

Suggestions for modifications of the present design and for additional research in this area were offered.

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Geri Lynn Stewart

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CHAPTER I

INTRODUCTION

The basic goal of the study of human motivation is to be able to account for the direction, vigor and persistence of an individual's behavior. Psychologists have long attempted to conceptualize how various factors interact to determine an individual's behavior in a given situation. Determination of the psychological effects of success and failure, and of the ensuing behavioral outcomes, represents one area in which motivational research has been conducted.

The general purpose of the present study is to examine, in an empirical manner, certain expectations concerning the differential effects of success and failure which derive from a theory of achievement motivation proposed by J.W. Atkinson (1957). This theory, which will be considered in greater detail later in this chapter, focuses upon five major variables which have evolved from earlier work in related areas. These focal variables are: 1) the motive to achieve; 2) the motive to avoid failure; 3) expectancy of success; 4) incentive value of attaining a goal; and 5) individual differences in the first four variables.

These variables have gained central importance in attempts to understand the psychological effects of success

and failure through studies conducted in four somewhat independent areas of research. Experiments in these areas have provided the stimulation for the development of Atkinson's theory and thus serve as the historical background for the present study. The research areas include: 1) selective recall and resumption of interrupted tasks; 2) level of aspiration; 3) the achievement motive; and 4) anxiety, or more specifically, fear of failure.

Interrupted Task Experiments

The interrupted task experiments represented attempts to assess the psychological effects of interrupting Ss and preventing them from finishing tasks in which they had become engaged. The usual procedure was to allow Ss to complete half of a group of tasks but to interrupt Ss on the remaining tasks before they could be completed. The difference in psychological effects resulting from completion of tasks, on the one hand, and from incompletion of tasks, on the other, was determined by asking Ss to recall the tasks they had worked on (Zeigarnik, 1927) or by allowing them opportunity for spontaneous resumption of tasks (Ovsiankina, 1928).

Because the literature concerning these early experiments is extensive, an attempt at complete coverage will not be made here. Only the findings most relevant to the present

study will be considered. Several good reviews of this early work are available for the interested reader (Lewin, 1935; Pachauri, 1935; Adler & Kounin, 1939; Atkinson, 1964).

Zeigarnik's work was primarily concerned with the effect of finished and unfinished tasks upon memory functions. According to Lewinian theory, when an intention or quasi-need is aroused in an individual, a related inner-personal region of tension is activated (Lewin, 1926). This tension system, which continuously presses toward resolution of the quasi-need in its aim to attain equilibrium, is resolved only when the need is satisfied.

Zeigarnik attempted to investigate the effect of such tension systems upon memory. Hypothesizing that an unresolved quasi-need might influence retention, she set out to discover if any differences in memory existed between interrupted tasks and completed tasks. Interruption of a task would presumably prevent normal resolution of the tension activated by beginning work on the task.

Zeigarnik found that when Ss were asked to recall the tasks they had worked on, the interrupted tasks were remembered approximately twice as well as the completed tasks. These selective recall results were reproduced several times by Zeigarnik. One factor, noted by Zeigarnik, which seemed to

enhance the recall of interrupted tasks was the degree of ambition or desire to succeed apparent in the individual. She further noted that other individual differences probably influenced the selective recall effect.

Soon after Zeigarnik carried out these initial studies, Ovsiankina (1928) discovered that Ss spontaneously tended to resume interrupted tasks more frequently than completed tasks. The Lewinian interpretation of these findings is that both recall and resumption of incompletely tasks resolve the tensions which correspond to the quasi-needs.

Later interrupted task experiments. After Zeigarnik's findings were published, few investigators were able to replicate her results in a satisfactory manner (Alper, 1946; 1948; 1952). Most investigators found several patterns of recall among Ss; moreover, the various patterns appeared to be related to certain situational variables and personality factors.

One of the situational variables which appeared to affect selective recall was the extent to which the situation in which the tasks were performed was test-like (ego-involving) in nature. Zeigarnik's experiments had been carried out in a relatively relaxed experimental setting.

Rosenzweig (1943) found, however, that when Ss regarded the tasks as a test of intelligence, the majority of Ss

recalled more completed than incompletely completed tasks. When Ss were not ego-involved, however, more incompletely completed tasks were recalled.

Further support for the importance of the ego-involvement variable was obtained by Lewis and Franklin (1944) and Glixman (1949) who found that recall of incompletely completed tasks decreased as threat to self-esteem was experimentally increased. These investigators concluded that selective recall was highly dependent upon the experimental conditions set up by the experimenter: under test-like or ego-involving conditions, Ss' ego-defense needs presumably take precedence over the need to resolve task tensions, thus leading to greater recall of the completed (i.e. success) tasks.

Success, failure and individual differences. Although most early studies with interrupted tasks focused upon the effects of situational variables upon selective recall, the influence of individual differences was not wholly ignored. Koch (1930) was one of the first to point out that individuals may differ in the manner in which they view personal success and failure: some people may habitually dwell upon their failures while others may focus upon their successes. Koch found that students differed in the recall of grades in the extent to which they emphasized past successes and failures. She

also reported a positive correlation between a tendency to recall failures and an index of personal and social maladjustment.

Additional studies concerned with the influence of individual differences upon recall were conducted by Rosenzweig (1933) and Rosenzweig and Mason (1934), who found that individual differences in pride appeared to influence selective recall and resumption of tasks. Under relatively non-ego-involving conditions, Ss rated high in pride tended to resume incompletely completed tasks (Rosenzweig, 1933); under ego-involving conditions, Ss rated high in pride tended to recall the successfully completed tasks (Rosenzweig & Mason, 1934).

Cartwright (1942), working with possible influences upon the attractiveness ratings of interrupted tasks, found that an S's expectancy of success or failure at the time of interruption was an important determinant of the task's later attractiveness. Both before and after performance on an interrupted task, each S was asked to rate the attractiveness of several tasks on a scale ranging from -100 to +100. S was informed that E's purpose was merely to learn which of the tasks S wanted to work on next.

Cartwright found that some Ss, who had been given instructions designed to induce feelings of failure when they

were interrupted, rated the unfinished tasks as less attractive (i.e. less desirable to work on next) after interruption. This decrease in attractiveness ratings appears inconsistent with Ovsiankina's finding that individuals tend to resume interrupted activities.

Cartwright's findings emphasize the importance of taking individual differences into account in interrupted task experiments. He noted that among the group anticipating failure, some Ss seemed to regard the interruption as an escape from inevitable failure while other Ss regarded the interruption as an obstacle on the way to the goal. Cartwright emphasized the need for a theory of failure which could account for both increases and decreases in the attractiveness of tasks.

Alper (1946) also stressed the role of individual differences in explanations of selective recall results. She theorized that the instructions given by the experimenter do not induce the same psychological set in all Ss. Proceeding on this basis, she found that, among Ss unselected for personality factors, different patterns of selective recall occurred. Among Ss selected on the basis of personality data, it was found that, in a given situation, Ss who tended to recall more completed tasks differed in personality from Ss who tended to recall more incompletely tasks. An additional finding was

that the direction of selective recall tended to reverse for both groups of Ss when the situation was changed from non-self-esteem involving to self-esteem threatening.

Ss who tended to recall incompletely tasks under non-self-esteem involving conditions and who tended to recall completed tasks when self-esteem was objectively threatened, scored high on personality parameters indicative of ego strength and self-confidence. These Ss were further characterized by only slight tendencies to feel guilt or shame following failure experiences.

Ss who tended to recall completed tasks under non-threatening conditions and who tended to recall incompletely tasks when self-esteem was threatened, were characterized by personality measures indicative of low self confidence, low ego-strength, and high capacity for suffering feelings of humiliation and inferiority following failure experiences.

Alper (1946; 1948) designated these two main patterns of selective recall as the Strong Ego pattern and the Weak Ego pattern, respectively. The Strong Ego individual was presumably characterized by a high tolerance for failure and by an ability to perform well under the threat of failure, while the Weak Ego individual was characterized by a low tolerance for failure and a poor performance under threat of failure. In

addition, Ss in the Strong Ego group tended to have a record of high academic achievement while Weak Ego Ss tended to have much lower academic records. Alper concluded that the direction of selective recall is mainly a function of an S's personality structure and is less a function of completion or incompletion of tasks.

In summary, the studies on selective recall of interrupted tasks demonstrate that individuals differ in recall as a function of: 1) individual differences in personality and 2) situational variables such as the ego-involving nature of the experiment. Differential reactions to completion and incompletion of tasks obtain among people in different settings, with some individuals more oriented toward success while others are more oriented toward avoiding failure.

More specific influences upon the psychological effects of success and failure have been treated by investigators working with level of aspiration.

Level of Aspiration

The level of aspiration concept, introduced in 1931 by Dembo, refers to the level of performance that an individual is presently attempting to attain on a particular task (Lewin, Dembo, Festinger & Sears, 1944). The level of aspiration should be distinguished from an individual's level of

expectation; the latter concept refers to the individual's ideal performance goal.

Some investigators (Chapman & Volkman, 1939; Gould & Lewis, 1940; Festinger, 1942b) have attempted to assess the level of aspiration as it fluctuates during a given activity; such assessments are generally based on Ss' verbal and written comments regarding their performance goals. It is maintained that, in general, the level of aspiration is either raised or lowered whenever the individual respectively attains, or fails to attain, his level of aspiration. These investigators recognize that individuals do differ, however, with a few people failing to raise the level of aspiration after success or failing to lower it after failure.

Gould (1939) pointed out that the level of aspiration probably serves different functions for different individuals. For some, the level of aspiration may serve as an incentive to improve the previous performance while for others, the level of aspiration may serve as a protection against possible failure. Summaries of the early work on level of aspiration may be found in Lewin, et al., (1944, pp. 333-378) and Atkinson (1964).

Resultant Valence Theory. This theory arose from the findings of early level of aspiration studies. The Resultant

Valence Theory (RVT), presented by Escalona (1940) and elaborated by Festinger (1942a), was devised in part to explain an individual's attraction to a particular task after experiencing success or failure on that task or some other task. More specifically, these investigators wanted to account for the decision of certain Ss to attempt more difficult (failed) tasks rather than choosing to remain with tasks where success would be more certain (Lewin, et al., 1944).

To account for such decisions which individuals make on the basis of task difficulty, two main variables were employed: the valence or attractiveness of a future success or failure at a given task, and the individual's estimated probability of attaining the goal.

Valence of success or failure. The positive or negative strength of a valence was said to vary with task difficulty level: as task difficulty increases, the positive valence of success increases while the negative valence of failure decreases; conversely, the positive valence of success decreases and the negative valence of failure increases as task difficulty is reduced. Thus, success on a task perceived as very difficult, for example, would be a highly attractive prospect; failure on the same task would be associated with a minimal amount of negative affect. Values ranging from -10 to +10

were assigned to the valence variable in order to indicate the relative strength of a given valence.

Subjective probability. The probability variable was said to consist of: 1) a subjective probability, or expectancy, of success (Ps), which ranges from zero to 100% as difficulty level of a task decreases; and 2) a subjective probability of failure (Pf), which changes in the opposite direction (from 100% to zero) as difficulty level decreases. It was assumed that Ps and Pf generally sum to 100%.

Resultant Weighted Valence. It was assumed that, for a given task, multiplicative relationships obtain between the valence of success and the probability of success, and between the negative valence of failure and the probability of failure. An individual's attraction to a given activity, then, was represented by the algebraic summation of the two multiplicative relationships; this sum was known as the Resultant Weighted Valence. The formula may be summarized as follows:

$$\begin{aligned} (\text{Valence of success} \times Ps) + (\text{Negative valence of failure} \times Pf) \\ = \text{Resultant Weighted Valence} \end{aligned}$$

Early studies with the RVT were concerned with Ss' reactions to attaining or failing to attain the level of aspiration, and with the effects of various instructions upon valence strength and subjective expectancies. In their attempt to account for individual differences in goal-setting and

preferences for task difficulty levels, Escalona, Festinger, and other early investigators in the area demonstrated the utility of the valence and probability variables. Both of these variables later assume major roles in the McClelland-Atkinson approach to achievement motivation.

McClelland's Research on Motivation

In the 1930's, H.A. Murray developed a method for assessing human motivation which was based on the assumption that an individual's underlying motives or drives can be discovered through an analysis of imaginative stories written by the individual. Soon after Murray's development of this instrument, known as the Thematic Apperception Test (TAT), D.C. McClelland decided to use the new method in his experimental research on human motivation.

In addition to accepting Murray's premise that motivation does have effects upon fantasy, McClelland further assumed that motives can be aroused and manipulated experimentally (McClelland, Atkinson, Clark & Lowell, 1953; McClelland, 1955).

One of the initial experiments performed by the McClelland group was undertaken to demonstrate the effects of a rather accepted motive, hunger, upon TAT responses (Atkinson & McClelland, 1948). It was found that Ss under one, four and 16 hours of food deprivation wrote imaginative stories with

increasing references to food deprivation, hunger, food-getting etc.

With this experimental demonstration of the usefulness of the TAT in assessing motive strength, McClelland initiated a program of research upon the motive to achieve. This research effort was based in part on the pioneering work of Sears (1940), Rosenzweig (1943) and Alper (1946) with ego-involvement and induced success and failure experiences.

Early research (McClelland, Clark, Roby & Atkinson, 1949; McClelland & Liberman, 1949) supported McClelland's assumption that motives expressed in fantasy, may be experimentally aroused and manipulated. These studies demonstrated that Ss' motive for achievement scores (n Ach), as determined by the TAT, increased as experimental instructions were made more achievement-oriented (ego-involving).

McClelland observed that certain traits seemed to characterize Ss with different n Ach scores (McClelland & Liberman, 1949). Ss who obtained moderate n Ach scores appeared mainly concerned with avoiding failure while Ss who obtained high n Ach scores appeared mainly concerned with achieving success.

Additional studies supporting the notion that n Ach scores do represent individual differences are contained in

The Achievement Motive (McClelland, et al., 1953), which is a comprehensive summary of the research carried out by the McClelland group from 1947 to 1952. More recent studies using the TAT method of assessing motives are contained in Motives in Fantasy, Action and Society (Atkinson, 1958) and The Achieving Society (McClelland, 1961).

In order to determine whether a high n Ach score means that an individual is always motivated to do well or is only motivated to do well under certain conditions, Atkinson (1953) measured the performance of high and low n Ach Ss under varied experimental conditions. Specifically, the likelihood that an S would perceive his performance as a personal success or failure was varied by using different sets of instructions with three groups. Half of the experimental tasks were interrupted by the experimenter and Ss were not permitted to finish them. The remaining tasks were completed by Ss.

Selective recall results showed that the greatest difference in Zeigarnik effect between high and low n Ach Ss occurred under the achievement-oriented instructions; high n Ach Ss recalled significantly more unfinished tasks under these conditions than low n Ach Ss.

Atkinson, following Lewin, considered the recall of unfinished tasks as a measure of the strength of one's tendency

to complete the tasks. He thus concluded that Ss high in n Ach are primarily motivated to do well when completion is perceived as personal success, and incompletion is perceived as personal failure, and that no differences in recall or level of performance may be expected when Ss do not expect their performances to be evaluated (unless other sources of motivation, such as desire for social approval, have been engaged). Additional studies have supported these conclusions (French, 1955; Atkinson & Raphelson, 1956). Thus the motive to achieve appears to have a significant influence on behavior only in certain situations.

Individual Differences in Anxiety

Because of the important relationships between manifest anxiety and the psychological effects of success and failure, and between manifest anxiety and the motive to achieve, a brief discussion of anxiety is in order.

Lucas (1952) found that the performances of Ss with high anxiety scores, as determined by the Manifest Anxiety Scale, became increasingly poorer on a verbal task as a function of the number of failures experienced. The performance of Ss with low anxiety scores, on the other hand, improved after failure and continued to improve as a function of the number of failures.

Similar results have been obtained by other investigators employing the Test Anxiety Questionnaire (TAQ) to assess anxiety levels (Mandler & Sarason, 1952; Sarason, Mandler & Craighill, 1952; Sarason, 1961). The TAQ, which has been extensively used by workers in the Atkinson group, was specifically designed to appraise the level of fear or anxiety that is generally aroused in an individual in an achievement-oriented or test situation.

The developers of the TAQ regarded anxiety as a "response-produced strong stimulus with the functional characteristics of drives..." (Mandler & Sarason, 1952, p. 166). In an achievement situation, the individual presumably responds to certain situational cues; these responses are assumed to produce a strong internal stimulus, which is regarded as a learned anxiety drive. Mandler and Sarason maintain that this anxiety drive elicits two general types of response, both of which contribute to the reduction of the drive: avoidance responses and completion responses. It is assumed that avoidance (task-irrelevant) responses and completion (task-relevant) responses are incompatible, and that conflict results when both types of response are present.

Individuals with high test anxiety are assumed to possess more avoidance, or task-irrelevant, habits than individuals

with low test anxiety. Thus, in achievement situations, individuals with high test anxiety presumably experience greater conflict between task-relevant and task-irrelevant tendencies than individuals with low test anxiety. High TAQ scorers are therefore generally expected to turn in poorer performances in test (or ego-involving) situations than low TAQ scorers. In non-ego-involving situations, however, differences in performance between the two anxiety groups should be less apparent since test anxiety is then minimized.

The motive to avoid failure. The influence of individual differences in anxiety and of the ego-involving nature of the experimental situation upon achievement motivation have been acknowledged by Atkinson (1957). The anxiety aroused in individuals by achievement situations is labeled as the motive to avoid failure (Maf) in Atkinson's model.

The Maf represents a relatively stable personality disposition to avoid the threat of failure, and is defined as "the capacity for reacting with shame and embarrassment when the outcome of performance is failure" (Atkinson, 1964, p. 244). An individual's score on the TAQ provides the operational definition for the Maf.

Atkinson's Theory of Achievement Motivation

Atkinson's theory of achievement motivation represents a

synthesis of the major findings from each of the foregoing areas of research. The theory itself was formulated in an attempt to predict and to explain the psychological and behavioral effects of success and failure upon individuals in achievement situations.

Atkinson borrowed two of his major variables from the Resultant Valence Theory: the incentive (valence) concept, which he defined as the attractiveness of a potential reward or goal, and the expectancy concept, which was defined as the subjective probability of attaining a particular goal.

Atkinson assumed that the value of an incentive, which an individual attaches to success on a given task, varies negatively with the individual's expectancy of success, and varies positively with task difficulty. The incentive value of success at a task may be represented by $1 - Ps$. If an individual has, for example, a low expectancy of success (high task difficulty), the incentive value of success will be high. Supporting data for this assumption have been obtained by Feather (1959) who found that a goal is more desirable (high incentive value) if it is hard to attain (low Ps value).

Basic principle of motivation. Relying heavily on conceptions formulated in the Resultant Valence Theory, Atkinson outlined his basic principle of motivation:

The strength of motivation to perform some act is assumed to be a multiplicative function of the strength of the motive, the expectancy (subjective probability) that the act will have as a consequence the attainment of an incentive, and the value of the incentive.

(Atkinson, 1957, p. 360)

Atkinson assumed that two motive tendencies are aroused in any achievement situation: the tendency to approach success (T_s) and the tendency to avoid failure (T_{af}). The strength of each tendency in an achievement-oriented situation is determined by the multiplicative combination of the three basic variables: motive, expectancy (probability), incentive.

Thus, T_s is assumed to be a multiplicative function of motive for success (M_s), subjective probability of success (P_s) and incentive value of attaining the goal (I_s); T_{af} is assumed to be a multiplicative function of motive to avoid failure (M_{af}), subjective probability of failure (P_f), and negative incentive value of failing to attain the goal ($-I_f$).

The resultant achievement-oriented tendency (T_a) may be represented as follows:

$$T_a = T_s - T_{af}$$

$$T_a = (M_s \times P_s \times I_s) + (M_{af} \times P_f \times -I_f) \text{ or}$$
$$(M_s \times P_s \times I_s) - (M_{af} \times P_f \times I_f)$$

Motive for success and motive to avoid failure. Atkinson has assumed that assessments of the M_s and M_{af} variables may

be obtained through use of the TAT and TAQ, respectively. He assigns values indicating the relative strength of these two motives on the basis of test scores obtained by each individual. For an S scoring high in n Ach and low in anxiety, for example, the Ms might be assigned a value of four while the Maf might receive a value of one. For an S scoring moderately high in n Ach and high in anxiety, Ms might be assigned a value of two while Maf might receive a value of four. The values assigned thus serve to indicate that some Ss have higher n Ach or test anxiety scores than other Ss, and that one of the two motives is usually dominant within the individual S.

The expectancy variable. Once the Ms and Maf have been engaged by the expectancy that performing some act will lead to goal attainment, changes in an individual's motivation are assumed to result from changes in his Ps. Initial Ps in a given situation depends upon the individual's past experiences in such situations (Atkinson, 1964). During the course of working at an activity, the individual experiences changes in Ps as a function of perceived successes and failures. Atkinson assumes that success generally raises the Ps while failure generally lowers the Ps.

Ps is assigned values ranging from zero (no chance of

success) to one (certainty of success). Because I_s , defined as $1 - P_s$, and P_s are multiplicatively related, the greatest approach tendency (T_s) occurs when $P_s = .50$. In such a situation, $P_s \times I_s$ yields the maximum possible value, .25. Potential approach motivation decreases as P_s moves in either direction away from .50. Similarly, the maximum avoidance tendency (T_{af}) results when $P_f (P_s) = .50$; T_{af} decreases as P_f moves away from .50.

Thus, the greatest approach and avoidance tendencies are associated with the same P_s value, .50. The strength of M_s relative to the strength of M_{af} , then, determines whether an individual will tend to approach or to avoid achievement situations.

When M_s is stronger than M_{af} , which is generally assumed to be true of most college students (Atkinson, Bastian, Earl & Litwin, 1960; Atkinson & Litwin, 1960), the formula for T_a yields its maximum value when P_s is .50, and yields decreasing values as P_s moves away from .50. Thus, achievement-oriented individuals are most attracted to tasks of intermediate difficulty and are least attracted to tasks in which success or failure is more certain (Feather, 1961).

When M_{af} is stronger than M_s , on the other hand, the formula for T_a yields its greatest negative (inhibitory) value

when Ps is .50; as Ps moves away from .50, negative Ta values tend to decrease. Because of the strong avoidance tendencies which achievement situations arouse in such individuals, they seek to withdraw from this type of situation altogether. If forced to choose among a group of achievement tasks, however, avoidance-oriented individuals tend to choose tasks which arouse the weakest inhibitory tendencies, i.e., very easy or very difficult tasks.

During the course of performing an activity, the individual will find, of course, that the activity has changed in attractiveness due to the influence of successes and failures upon his initial Ps . If an individual fails on a task initially regarded as very easy, the Ps will decrease toward .50. If he succeeds on a task initially perceived as very difficult, Ps will increase toward .50. In these instances, the tasks would become more attractive to approach-oriented individuals and more aversive to avoidance-oriented individuals.

If the person succeeds on a task initially regarded as easy, his Ps will move away from .50 toward 1.00. If he fails on a task initially perceived as difficult, Ps will move away from .50 toward zero. In such situations, the approach-oriented person would regard the tasks as less attractive while the avoidance-oriented person would find them less

aversive.

On the basis of these assumptions made by the model, differential reactions to tasks which vary in difficulty have been predicted for approach-oriented and avoidance-oriented individuals. Supporting data for these predictions have been obtained by various investigators.

It has been shown, for example, that such individuals differ in extent of persistence on easy and difficult tasks after experiencing success or failure (Atkinson & Litwin, 1960; Feather, 1961; Feather, 1963a). Studies (Feather, 1963a; Moulton, 1965; Weiner, 1965b) have also demonstrated differences between approach-oriented and avoidance-oriented individuals in their preferences for working on tasks of certain difficulty levels. Atkinson and co-workers have demonstrated differential levels of performance between high and low achievers; high achievers tend to perform at higher levels than low achievers in various situations: arithmetic problems; final examinations; ring toss games; drawing X's in circles (Atkinson & Raphelson, 1956; Atkinson & Reitman, 1956; Atkinson & Litwin, 1960).

Success, failure, and task resumption. Of particular relevance to the present study are studies relating individual differences in task approach-avoidance orientation to

persistence or resumption of incompletely or failed tasks (Atkinson, 1953; Atkinson & Raphelson, 1956; Atkinson, et al., 1960; Atkinson & Litwin, 1960; Feather, 1961; 1963a; Atkinson & Cartwright, 1964; Weiner, 1965a; 1965b).

Feather's work on persistence at a given activity (Feather, 1961; 1963a) is related to the present study and also provides the best evidence for Atkinson's model. Persistence may be regarded as the repeated choice of an ongoing activity; this choice results from a comparison among the strengths of the total motivation to perform the current behavior and any alternative behaviors open to the individual (Feather, 1961).

Feather (1961) presented fictitious norms to Ss who had been classified on the basis of resultant achievement motivation ($M_s - M_a$). The norms indicated the difficulty levels of an initial achievement task and an alternative achievement task. Ss were initially presented with an insoluble task to work on: Ss in one condition were told that the task (puzzle) was extremely difficult ($P_s = .05$) while Ss in the second condition were told that the puzzle was moderately easy ($P_s = .70$). Ss were allowed to take as many trials on the initial task as they desired but were free to initiate work on an alternative puzzle of moderate difficulty ($P_s = .50$) whenever

they so desired. Feather assumed that Ps values would continually decrease as a function of repeated failure on the initial insoluble puzzle.

It was found that high Ms-low Maf Ss with initial Ps values of .70 persisted longer on the insoluble task than high Ms-low Maf Ss with initial Ps values of .05. This result follows from Atkinson's theory: achievement motivation for these Ss should initially increase in the Ps = .70 group as failure moves the Ps toward .50; additional failure should then lead to decreasing approach motivation. In the Ps = .05 condition, however, achievement motivation for these Ss should continually decrease with failure because Ps is being shifted further from .50.

Low Ms-high Maf Ss, on the other hand, persisted longer on the original task when initial Ps was .05 than when the initial Ps was .70. This finding also follows from Atkinson's theory because failure in the Ps = .70 condition should move Ps toward .50, thus resulting in a maximal avoidance tendency. Failure in the Ps = .05 condition, however, should move the Ps further from .50, thus resulting in much weaker avoidance tendencies for the task.

Feather's study and a later replication (Feather, 1963a) thus strongly support assumptions made by Atkinson's theory

concerning individual differences in task approach and avoidance orientations.

Weiner's research (1965b) is also related to the present study. High and low n Ach Ss were interrupted on half the tasks they were working on but were allowed to complete the remaining tasks. Following this initial set of tasks, success or failure experiences on an independent task were given to Ss. The Ss were then given the opportunity for spontaneous resumption of the interrupted tasks.

Weiner found that high n Ach Ss spontaneously resumed the interrupted tasks after experiencing failure while low n Ach Ss resumed the tasks after experiencing success. Weiner concluded that Atkinson's model could not account for the tendency of low n Ach Ss to spontaneously resume tasks in an achievement-oriented situation.

Weiner initially assumed, however, that among low n Ach Ss, the Maf was likely to be high and would thus cause these Ss to avoid achievement-oriented activities. We have already noted, however, that among college students, Ms is generally assumed to be relatively stronger than Maf (whether n Ach scores are high or low). Since Weiner's Ss were college students, the validity of his original assumption may be held in some doubt.

If the Ms is stronger than the Maf among Weiner's Ss, then his findings clearly follow from Atkinson's theory. Feather (1965) demonstrated that Ss' initial Ps values on a task vary positively with n Ach scores, and that the Ps values are modified in the expected direction by successes and failures during the task activity. If it is assumed that high n Ach Ss tend to approach ambiguous or new task situations with initially high Ps values and that low n Ach Ss approach the same tasks with initially low Ps values, the model leads to the prediction that low n Ach Ss will have higher Ta values for a successfully completed task rather than for a failed task, and that high n Ach Ss will have higher Ta values for a failed task rather than for a passed task.

Thus, if Ss are to resume a task at all, high n Ach Ss would be expected to resume the failed task and low n Ach Ss would be expected to resume the passed task. This is, of course, what Weiner found. Whether or not Ss will spontaneously resume tasks depends upon the strength of positive Ta values and hence, on Ps values effective at the moment of decision to resume or not to resume.

Present Study

The present study was designed to obtain additional

information on the effects of induced success and failure experiences on Ss' choice of resumption tasks. This study differs from earlier investigations in its manipulation of independently obtained Ps values. These Ps values provide the basis for predicting differential reactions among individuals to success and failure; as such, they replace the measures of anxiety and achievement generally employed in studies generated by Atkinson's model.

On the basis of Ps estimates obtained on questionnaires, selection of Ss who tend to indicate very high or very low Ps estimates for descriptions of achievement-situations may be undertaken. It is assumed that such high and low Ps Ss will tend to approach actual achievement situations with initial Ps values which are similar to the assessed Ps values.

Following Atkinson's model, and with the assumption that Ms is relatively stronger than Maf among college students, predictions regarding task resumption choices can be made for these Ss under certain conditions. Specifically, if the Ss experience induced success on one task and experience induced failure on a second task, the attractiveness of the two tasks should differ between the high Ps and the low Ps Ss.

This difference is expected because the high Ps Ss will presumably approach both tasks with an intially high expectancy

of success while the low Ps Ss are expected to approach both tasks with an initially low expectancy of success. Both the success experience and the failure experience will then move the Ps values of all Ss up on one task and down on the other task, respectively. Success will shift the Ps values of one group (low Ps) toward .50, while, at the same time, the Ps values of the other group (high Ps) will be shifted away from .50 toward 1.00. Failure will move the Ps values of the low Ps group away from .50 while the Ps values of the high Ps group will be shifted toward .50. Thus, the attractiveness of the tasks should differ for the two groups after success and failure experiences.

The specific predictions in this study are as follows:

Hypothesis I.

It is proposed that, when Ss in the high Ps group are confronted with a forced-choice situation in which they must choose whether to resume the task on which they have succeeded or the task on which they have failed, the failure task will be resumed.

Hypothesis II.

It is further proposed that, when Ss in the low Ps group are confronted with a forced-choice situation in which they must choose whether to resume the task on which they have

succeeded or the task on which they have failed, the success task will be resumed.

CHAPTER II

METHOD FOR STUDY I

Two complete studies were carried out with a total of 135 introductory psychology students at the University of Alberta. The failure of the first study to provide clear evidence regarding the hypotheses proposed in the preceding chapter prompted a second study, which was designed to clarify possible methodological problems involved in the earlier work.

In order to present a clear description of all of the procedures used, the two studies will be discussed separately. The methodology and results of the first study will be described in this chapter and the next chapter, respectively, while the methodology and results of the second study will be described in Chapters Four and Five, respectively.

Subjects

Twenty-seven female students and 26 male students in the introductory psychology course participated in the first study (Study I). These students were selected from a total of 499 introductory psychology students on the basis of their scores on a probability-of-success questionnaire. The questionnaire and the selection procedures will be described in the next

section. Course credits were earned by students for participation in this experiment.

Probability-of-Success Questionnaire

The need for an instrument capable of assessing Ps values has existed since the initiation of work with subjective expectancies. Atkinson and McClelland originally assumed that the correspondence between the objective Ps, stated by the experimenter, and the subjective Ps was close enough to consider them roughly equivalent. Experiments by Feather (1961; 1963a; 1963b; 1965; 1966) have, in particular, included norms in the instructions to Ss in order to induce similar Ps levels in all Ss.

It has been found, however, that a given objective probability does not induce the same subjective probability in different individuals (Rotter, 1954; McClelland, 1961). Atkinson has summarized the various techniques employed by investigators who have attempted to assess and to vary subjective probabilities of success (Atkinson & Feather, 1966, pp. 327-370). He has also emphasized some of the inadequacies in these various methods and has pointed to the need for developing more valid methods of measuring Ps values. The Ps questionnaire devised for the present study represents an attempt to obtain valid assessments of underlying probabilities

of success.

The probability-of-success questionnaire (PSQ) was devised as a means of selecting individuals with extreme subjective probability of success (Ps) values. It was assumed, after Atkinson (1964) and Feather (1965), that some individuals tend to approach new situations with relatively high expectancies of success (high Ps values) while others tend to enter such situations with relatively low expectancies of success (low Ps values). The basic requirements to be met by the questionnaire items were: 1) to distinguish between Ss with generally high and generally low Ps values, and 2) to yield results which could be generalized, with apparent validity, to the experimental task.

It was decided that these conditions could best be met by having students rate their expected performances in several task situations which would be similar to the later experimental task situation. Tasks chosen for the questionnaire were familiar to most students and represented somewhat different areas of ability. It was expected that in both the questionnaire and task situations, Ss would have to rely on past experience in similar achievement situations in order to estimate their chances for success.

The questionnaire consisted of brief descriptions,

including fictitious performance norms, of the following six tasks: digit substitution, anagrams, analogies, perceptual reasoning,¹ scrambled sentences and number series. (See Appendix A). For illustrative purposes, the questionnaire description of the anagrams task is presented below:

Each item consists of a group of scrambled letters. The task is to unscramble or rearrange the letters to form a common English word for each item. Difficulty is varied by increasing or decreasing the length of words to be rearranged.

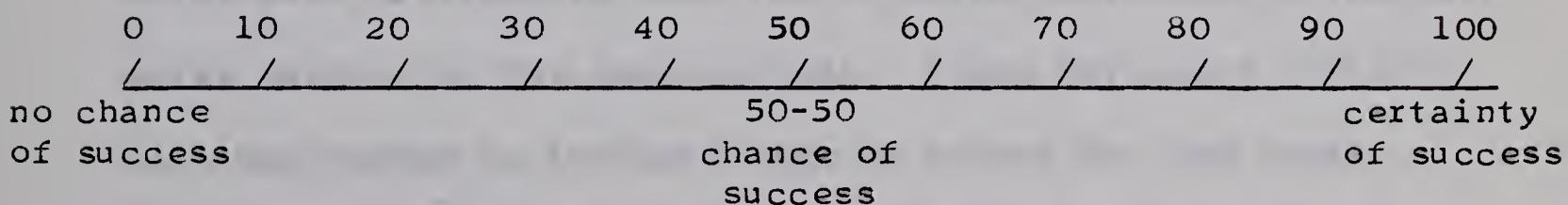
Subjects (Ss) were informed that the psychology department was interested in how certain groups of students felt about several tasks which had, presumably, been used to predict performance in graduate school. Ss were told that, on the basis of past results, each task consisted of a specific set of items which approximately 50% of graduate students could complete successfully. Ss were then required to estimate their chances of success for completing the same items attempted by graduate students.

They indicated their Ps values by circling the appropriate number on an eleven-point scale ranging from zero to 100. (See Appendix A). Thus it was possible to determine where individuals place themselves in relation to the norm group in

¹ Selection of the perceptual reasoning, or critical, task will be described under "Success and Failure".

several situations. To lend credulity to E's stated reasons for giving the questionnaire, Ss were also asked to indicate their feelings about working on each of the tasks. The norm group reference and scale are presented below:

On the basis of past results, psychologists have compiled a set of anagrams which approximately 50% of graduate students can successfully complete within the time limits. On the following scale, indicate what you believe your chances for success are for this compiled set of anagrams. Circle the appropriate number on the scale.



Indicate how you would feel about working on this task:

Pilot Work. Several preliminary studies with the questionnaire were carried out to determine the appropriateness of the task descriptions, norm groups and rating scale which had been tentatively decided upon. It was intuitively expected that the mean Ps ratings of Ss would be distributed over the range of scale values, with the bulk of these ratings falling in an intermediate area.

On the basis of two early studies involving 52 introductory psychology students at Red Deer Junior College (R.D.J.C.)

and at the University of Alberta (U. of A.), it was decided that task descriptions presented without examples were sufficiently clear to Ss: that is, the mean Ps values of Ss working with examples and those working without examples were the same. It was anticipated that descriptions presented alone would help decrease the number of external influences which could potentially affect Ss' Ps estimates.

This early work further revealed that Ss' mean Ps estimates were distributed over the Ps scale, with only a few estimates falling at the extreme ends. There were more individuals who tended to indicate high Ps values for the tasks, however, than there were individuals who indicated low Ps values.

In an additional study with 39 introductory psychology students at R.D.J.C., the questionnaire norm group was changed from university students, which was used in the two earlier studies, to graduate students. Ss were told that 50% of graduate students could complete a given task successfully. The obtained mean Ps values (over five tasks) did not differ between Ss working under the university vs. graduate norm groups; the Ps values for the critical task, perceptual reasoning (hereafter referred to as P.R.), were, however, slightly lower when the graduate norm group was used. It was decided

to retain the graduate student norm group in the hope that low Ps individuals could be more easily identified.

In order to determine how closely related the critical task estimates were to the five other Ps estimates, a product-moment r was computed between the P.R. estimates and the mean of the five other estimates. Since the obtained correlation was low ($r = .45$), it was decided that both estimates would be needed to approximate an individual's general Ps value. This would presumably provide a more reliable index of the individual's general Ps.

Administration. The Ps questionnaire was administered to 499 introductory psychology students at the U. of A. in their weekly tutorial sections. Group size ranged from four to 35 students; approximately 40 tutorial sections were approached.

Introductory remarks were memorized by E and were given as follows:

I'm a graduate student in the psychology department here. For some time, our department has been working closely with university administrators on a rather extensive research project. This project will eventually involve a large segment of the university population. At this particular stage of the research, however, we need to obtain some basic information from selected groups of undergraduate students. We would therefore appreciate your cooperation and about 10 minutes of your time in order to fill out this questionnaire.

For the purpose of general identification, please

write your name, tutorial section number, and telephone number,² at the top of the first page. The questions you are asked to answer are not of a prying or personal nature, but we can assure you that only those people directly involved in this research will have access to the completed questionnaires.

After all students had finished reading the first page of instructions, E went over the main points and asked for questions. Ss then completed the questionnaire. Time for completion ranged from five to eight minutes.

Selection of Subjects. Selection of Ss was based on their Ps estimates for P.R. and upon the median Ps values for the five other tasks. Students who had a median Ps of 50 or lower and a P.R. estimate of 40 or lower were selected as low Ps Ss. Forty-three students were included in this category; their overall mean Ps value was 42 while the mean P.R. estimate was 29. A typical student in this group, then, felt that he had approximately 29 chances in 100 of succeeding on the P.R. task.

Students who had both a median Ps value and a P.R. estimate of 70 or greater were selected as high Ps Ss. Forty-three students were classified as high Ps Ss; their overall mean Ps value was 77 while the mean P.R. estimate was 75. These high and low Ps Ss will be referred to as critical Ss.

²The request for phone numbers was eventually dropped as a couple of students suspected that the questionnaire was really part of a psychology experiment.

Critical Ss were obtained for this experiment by passing lists of eligible names around the three psychology lecture sections. Students were asked to participate in this experiment if their names appeared on the list. Twenty-seven of the possible 43 low Ps Ss participated in the experiment, and 26 of the possible 43 high Ps Ss participated. Selected students who did not sign up for the experiment were contacted by telephone and requested to participate. Most of these students had already completed the course requirement for participation in experiments and were unwilling to participate in an additional experiment unless required to do so.

Success and Failure

Testing the hypotheses of this study requires that each S experience success on one kind of task and experience failure on another task, and then be confronted with a forced-choice situation in which he must choose which of the two tasks he would prefer to continue working on.

In order to induce success and failure experiences in a realistic manner, it was felt that the use of soluble and insoluble variations of two tasks was preferable to the use of fictitious norms or instructions. With soluble and insoluble tasks, an S's perception of his performance depends directly on the number of successes and failures he knows he has had

rather than on E's interpretation of his performance.

The treatment tasks, then, had to be adaptable to both soluble and insoluble forms. Moreover, they had to reflect clearly to each S his successes and failures. The tasks also had to be similar enough to prevent pre-experimental biases from influencing task resumption, yet distinct enough to make Ss aware of working on two tasks.

In some early exploratory work, anagrams and scrambled sentences were employed as the means for inducing success and failure. Among the main difficulties encountered in the use of these tasks were: 1) considerable variation in solution times for a given item; 2) difficulties in selecting items of equivalent difficulty; and 3) vagueness surrounding the correctness or incorrectness of answers. It was apparent that these tasks were inappropriate.

Further work revealed that the perceptual reasoning task seemed best adapted to the study's needs. This task consists of tracing over every line of a complex geometrical figure without lifting the pencil or re-tracing any lines. Solubility and insolubility of these figures is easily manipulated by following a simple rule concerning the number of lines intersecting at one point.³ Insoluble designs contain three

³ Bernard Weiner: personal communication.

or more instances in which three lines, or a greater odd number of lines, meet at one point.

The task itself can be varied to meet the "similar but distinct" criteria: geometrical designs for this study were placed in either square-shaped or circular figures. Success and failure were counterbalanced between the two tasks by placing identical soluble and insoluble designs in both the square-shaped and circular figures. Thus one-half of the Ss worked on soluble circles and insoluble squares while the remaining Ss worked on insoluble circles and soluble squares.

Puzzles were contained in small 3" by 3" booklets; tracing paper was inserted between the puzzles. Puzzle designs were constructed by E after sample perceptual reasoning puzzles were received from Bernard Weiner, (See Appendix B).

Pilot Work. The number, as well as the ratio, of soluble and insoluble puzzles to be contained in the booklets had to be determined through pilot work. Additional work was needed to determine suitable instructions and time limits for working on the puzzles. This section will briefly describe the preliminary work with puzzles.

Initially, 13 introductory psychology students worked on booklets containing 28 puzzles (12 soluble - 2 insoluble circles; 12 insoluble - 2 soluble squares). When only two of

the 13 Ss chose to resume the failure task, it was thought that Ss might be experiencing "too much" failure; that is, their Ps values for the failure task may have been reduced to negligible amounts.

Further support for this conjecture was obtained from three additional introductory psychology students who worked on 20-puzzle booklets (10 soluble circles - 10 insoluble squares). None of these students resumed the failure task. To decrease the possibility that negligible Ps values might result from working on the failure task, several decisions were made about the contents of the booklets: 1) it was decided that booklets should contain approximately 20 puzzles: the success task should consist of 10 soluble puzzles while the failure task should consist of seven insoluble and three soluble puzzles; 2) it was further decided that two of the first three puzzles in every booklet should be soluble puzzles while the remaining puzzles should be randomly arranged.

It was anticipated that the effect of these decisions would be to curtail the development of extreme Ps values, particularly in relation to the failure task; this task should induce failure experiences but should not appear impossible.

Additional pilot work with 45 introductory psychology

students helped to resolve the remaining details concerning administration of the puzzles. Twenty-three of these Ss worked under a 50-second working time allowance per puzzle; under these conditions only one S chose to resume the failure task. The 22 remaining Ss worked under a 40-second time allowance; under this reduced time limit, five Ss chose to resume the failure task.

It was noted that most Ss were actually able to complete the soluble puzzles within 30 seconds; thus, a time limit of 40 or 50 seconds merely increased the amount of time Ss spent working on insoluble puzzles. The longer time limit could conceivably enhance the failure experience to such a degree that Ss might perceive the insoluble puzzles as impossible (or at least not worth toying with again). It was thus decided to set the working time for each puzzle at 30 seconds, although 40 seconds was to be allowed on the first three puzzles.

The 45 Ss composing these two pilot groups worked on somewhat modified puzzle booklets: commonly failed soluble puzzles in the earlier studies had been replaced by easier puzzle designs. Most Ss were still unable to solve all of the soluble puzzles, however, and a few Ss indicated that they had "solved" an insoluble puzzle. When an S's performance deviated

markedly from the designated ratio of successes and failures for each task, it could not be assumed that he was experiencing success and failure on the appropriate tasks. Thus, criteria for acceptable performances had to be defined. It was decided that each S had to solve seven or more of the puzzles in the success condition and could "solve" no more than four puzzles in the failure condition in order to be included in the analysis of data presented in the next chapter.

Administration. Dittoed instruction sheets containing norm group references and rules for tracing the puzzles were given to all Ss at the beginning of the experimental session. (See Appendix B). The instruction sheet informed Ss that the P.R. test, which they were about to take, had been used to evaluate graduate students in the past, and that 50% of graduate students were able to complete the puzzles successfully. The sheet further related that psychologists wanted to see how well the Ss could do on the same puzzles.

Ss were then instructed to trace over the puzzle designs according to the specified rule, which included a 30-second time limit per puzzle. Ss could begin tracing a new puzzle only after E said, "Go on to the next puzzle."⁴ Ss were

⁴ In order to prevent Ss from linking the experiment with the Ps questionnaire which they had completed some weeks earlier, Dr. W. Blanchard served as E during all experimental sessions for Study I and Study II.

instructed to mark a plus in a small box at the top of the puzzle page when they succeeded in solving a puzzle, and to mark a minus when they failed to solve a puzzle. This requirement served two functions: 1) impressing upon S the tasks on which he had succeeded or failed, and 2) informing E as to S's perception of his own performance.

Manilla envelopes which contained puzzle booklets and extra tracing paper were placed on Ss' desks before the instructions were handed out. After E went over the instructions with Ss, they opened the envelopes, and E directed them to begin work on the puzzles.

After Ss completed the initial booklet of 20 puzzles, E explained the second phase of the experiment.

The second phase of this experiment consists of working on another group of these puzzles. In this phase, there will be no time limit; you may take as long as you like on each puzzle. For this part of the experiment, you are offered a choice of the type of puzzle you would prefer to continue working on. Please indicate in writing, on the front of the booklet which you now have, which type of figure you would prefer to continue working on. Please do this independently.

I will come around and give each of you a new booklet, containing the type of puzzle you have chosen. Please show me your choice; don't tell me. Do not begin to work on the new puzzles until told to do so. Indicate when you are through, but remain in your seat.

All of the puzzles in the second booklet were soluble; Ss were able to complete them in 10 to 15 minutes. A brief, dittoed questionnaire was given to Ss to complete before they

left the hour-long experimental session. (See Appendix C).

This questionnaire asked Ss to state their feelings about working on the puzzles and their reasons for choosing to resume the type of puzzle they did.

Procedure for Study I.

Three group testing sessions were held in Study I: one on a weekday afternoon and two on weekday evenings. The groups consisted of 14, 28, and 11 Ss, respectively. All sessions were held in the same room with the same seating arrangement. The first group of selected Ss with extreme Ps values (critical Ss) was run under the conditions described in the preceding section.

The second and third groups of critical Ss were run under conditions similar to those of the first group with one modification. After Ss had completed the initial puzzle booklets, E gave "relaxed" instructions regarding task resumption. It was felt that the resumption instructions used previously might have led Ss to think that they should resume the type of puzzle on which they had performed best. The new instructions were delivered by E as follows:

For the second part of this period, I would like you to work on some new puzzles which I have recently worked out. These new puzzles are similar to the ones you have just worked on, but they have never been used to evaluate students. Right now, I am simply trying them out.

Each of you will receive 10 new puzzles to work on. There will be no time limit so you may take as long as you like on each puzzle. Since there is no time limit and only 10 puzzles, you are offered a choice of the type of puzzle you would prefer to continue working on. Please indicate in writing, on the front of the booklet which you now have, which type of figure you would prefer to continue working on. Please do this independently.

I will come around and give each of you a new booklet containing the type of puzzle you have chosen. Please show me your choice; don't tell me. Do not begin to work on the new puzzles until told to do so. Indicate when you have finished but remain in your seat.

The rest of the instructions and general procedure were similar to those used previously.

CHAPTER III

RESULTS FOR STUDY I

The data relevant to the hypotheses of this study consist of the resumption choices made by Ss. The prediction regarding task resumption for each S was based on the S's score on the Ps questionnaire.

To determine if the results actually support the hypotheses, each S was classified in two ways: in terms of his Ps score (high or low) and in terms of the task he chose to resume (either the soluble task on which he had experienced success or the insoluble task on which he had experienced failure). The hypotheses are supported if high Ps Ss tend to resume the "failure" task while low Ps Ss tend to resume the "success" task. A Fisher Exact Test (Siegel, 1956) was performed to determine significance of results.

The task resumption choices made by the first group of Ss are presented in Table 1. Each S has been classified according to both his Ps rating and his resumption choice. Table 1 indicates the numbers of high and low Ps Ss who chose to resume either the success task or the failure task. Data from three of the original 14 Ss were omitted from this summary because their performances on the puzzle booklets did not meet

the success-failure criteria.

TABLE 1

Resumption Choices of First Critical Group

	Resumed Success Task	Resumed Failure Task
High Ps Ss	6	0
Low Ps Ss	5	0

The data clearly do not support the hypothesis that high Ps Ss will tend to resume the failure task. Contrary to the pilot data, no difference in resumption choice is observed among these Ss ($P = 1.00$, Fisher Exact Test).

It was conjectured that the resumption instructions used with this first critical group might have moved Ss to assume that they should resume the puzzle with which they were most proficient. "Relaxed" resumption instructions, specifically designed to avoid such implications, were then used with the next two groups of Ss.

The task resumption data from the second and third critical groups of Ss have been combined and are presented in Table 2. Results from seven of the initial 39 Ss were omitted from the table due to their unacceptable performances on the puzzle booklets.

TABLE 2

Combined Resumption Choices of Two Groups
under "Relaxed" Resumption Instructions

	Resumed Success Task	Resumed Failure Task
High Ps Ss	15	1
Low Ps Ss	15	1

The high Ps Ss have again reacted contrary to prediction. The two groups of Ss clearly do not differ in the proportions with which they fall into the two resumption classes ($P = .757$, Fisher Exact Test). There appears to be no tendency for high Ps Ss to behave differently from low Ps Ss in this type of resumption situation.

CHAPTER IV

METHOD FOR STUDY II

Due to the overwhelming preference of all Ss for the success task in Study I, the presence of some defect in the method of this study appeared to be a definite possibility. Since variations with the P.R. puzzles and with the resumption task instructions had already been carried out with little corresponding effect upon Ss' preferences for the success task, other changes needed to be considered.

The most logical step, it appeared, was to vary the ability level of the norm group used in the experimental instructions; the differential effect of two distinct norm groups (college students and graduate students) upon Ss' questionnaire estimates for the P.R. task was noted earlier. It is assumed that, when reference is made to the performance of a norm group, an S tends to compare his ability with that of the norm group; it is further assumed that this comparison leads to a predictable modification in the S's initial Ps. These assumptions follow from research on the social determinants of level of aspiration (Chapman & Volkman, 1939; Gould & Lewis, 1940; Festinger, 1942b). An additional assumption made for the present study is that corresponding

increases or decreases in final Ps values result from the elevation or reduction of initial Ps values.

It was specifically expected that Ss' initial Ps estimates would be elevated when a norm group lower in ability than the Ss was employed, and that the initial estimates would be reduced when a high-ability norm group was employed.

If these assumptions about the raising and lowering of Ps expectancies are valid, then related changes in resumption choice should follow. That is, it is expected that randomly selected Ss who begin the puzzles with initially high expectancies of success (under a low-ability norm group) will show a greater tendency to resume the failure task than randomly selected Ss who approach the puzzles with initially lower expectancies of success (under a high-ability norm group). This follows from Atkinson's theory since the final Ps values of the high expectancy group should be close to .50 for the failure task (and near 1.00 for the success task) while the Ps values of the low expectancy group should be close to .50 for the success task (and near zero for the failure task).

Pilot Work. The basic procedures from Study I, including the "relaxed" resumption instructions, were retained in Study II. In a single preliminary study, a fictitious high school norm group was employed in the experimental instructions.

Ss were informed that 50% of high school students were able to complete the P.R. puzzles successfully, and that 50% were unable to do so. It was expected that this relatively low-ability norm group would enhance Ss' initial Ps values and would lead to correspondingly higher final Ps values (than would be obtained if, for example, a college student norm group were used). Thus, a relatively large number of Ss was expected to choose to resume the failure task.

Results from four of the 13 Ss were discarded due to unacceptable puzzle performances. Two of the remaining nine Ss chose to resume the failure task; a third S, who just missed meeting the success-failure criteria, also chose to resume the failure task. Although the number of Ss choosing the failure task fell short of expectation, these results did suggest that the norm group cited in the instructions might be an influence upon Ss' resumption choices.

Subjects. Forty female students and 42 male students in the introductory psychology course at the U. of A. participated in this study (Study II). These Ss had participated in an earlier, unrelated experiment which was to consist of two sessions. When the second session was prevented by technical difficulties from being held, the Ss were asked to participate in this study to earn their course credits. Ss believed that

this study was the follow-up session for the original experiment.

Procedure for Study II

Group testing sessions were conducted on three weekday afternoons. The number of Ss varied from 25 to 30 per session. The same room and seating arrangement were used for the three sessions.

The three groups of Ss were run under conditions identical to those used in Study I, except for the modification in norm groups. A different norm group, consisting of either high school students, university students or graduate students, was used in each session. All of the multilithed instruction sheets were identical to those used in Study I except for the norm group variation.

CHAPTER V

RESULTS FOR STUDY II

The data for this study consist of the resumption choices made by Ss. The prediction regarding task resumption for Ss was based upon the norm group reference used in the instructions. It was predicted that an increasing number of Ss would tend to resume the failure task as the general ability of the norm groups decreased. The hypotheses are supported if an increasing number of Ss resumes the failure task in the following order of norm groups: graduate, university, high school.

The task resumption choices made by Ss working under the three different norm groups are presented in Table 3. The actual number of Ss in each norm group that chose to resume either the success task or the failure task is indicated in the appropriate cell. Data from 20 of the total 82 Ss in Study II were discarded due to unacceptable puzzle performances.

Because these data do not meet the assumptions of an appropriate statistical test, a formal statistical analysis of results was not carried out. When the data are presented in frequencies in more than two categories, as they are here, only the Chi Square test for K independent samples is

applicable (Siegel, 1956, p. 193). This test cannot, however, be used on these data because the expected frequency for three of the six cells is less than five Ss. It is evident, however, that the use of different norm groups did not produce a marked change in resumption choices.

TABLE 3

Resumption Choices of Three Groups under
Different Norm Conditions

<u>Norm Group</u>	Resumed Success Task	Resumed Failure Task
High School	19	1
College	20	4
Graduate	19	0

CHAPTER VI

DISCUSSION

The results presented for Study I, in Chapter Three, clearly offer no support for Hypothesis I but may offer some support for Hypothesis II. Hypothesis I, it will be recalled, specifies that high Ps Ss will resume the task on which they have experienced failure; Hypothesis II specifies that low Ps Ss will resume the task on which they have experienced success.

High Ps Ss did not conform to the expectation that they would choose to resume the failed task: virtually all Ss in the high Ps group elected to resume the success task. Low Ps Ss, on the other hand, conformed to the expectation that they would choose to resume the success task.

This lack of variability among the resumption choices in Study I is quite unexpected and renders impossible a precise interpretation of the results. Two distinct possibilities exist regarding the meaning of these findings: 1) the choice of high Ps Ss to resume the success task may be offered as negative evidence for Atkinson's theory; or 2) the complete lack of variability among resumption choices may be considered in terms of some methodological defect in Study I.

The possibility that a defect may be present in our

method appears to be enhanced by the lack of expected findings in Study II. It will be recalled that norm groups were manipulated in this study in an attempt to pull out the differential effects of success and failure upon randomly selected individuals. It was felt that these effects may have been obliterated in Study I through the use of a high-ability norm group. In both studies, it was expected that the use of norm groups would affect Ss' initial Ps values and, hence, Ss' final Ps values.

In Study II, it was hypothesized that differential resumption of the failure task would occur among Ss in the three different norm conditions, with the greatest resumption of the failure task occurring among Ss working under the lowest-ability norm group. The least resumption of the failure task was expected to occur among Ss working under the highest-ability norm group. These expectations were not, however, confirmed; nearly all Ss chose to resume the success task.

The fact that both studies yielded virtually no variability among resumption choices strongly suggests the possible existence of defects in our method. The focal point of this discussion, then, will be to consider some of the major variables involved in these two studies, and to speculate regarding some of their possible effects upon resumption choices.

Ps Questionnaire

Several preliminary studies were carried out for assessing the potential usefulness of the Ps questionnaire in discriminating between Ss with different Ps values. When it was determined that the questionnaire did yield a broad distribution of Ps estimates with only a few extreme estimates, the instrument was assumed to be a potentially valid one for assessing subjective Ps values.

The validity of the questionnaire is dependent, of course, upon a close correspondence between an individual's subjective probability of success and the probability which the individual indicates on the questionnaire. Weiner⁵ has suggested that low achievers may tend to overestimate or to underestimate their subjective probabilities of success. If the probabilities indicated by low Ps Ss on the questionnaire do reflect underestimations of actual Ps values, then these Ss may actually approach achievement situations with initial Ps values greater than .50. If so, these Ss should find the failure task more attractive than the success task, and should therefore tend to choose the failure task in the resumption situation. This result did not, of course occur.

⁵ Bernard Weiner: Personal communication.

If the questionnaire estimates represent overestimations of actual Ps values for low Ps Ss, then this group should approach achievement situations with initial Ps values considerably lower than .50, and should therefore find the success task far more attractive in the resumption situation, which these Ss apparently did. The fact that all Ss found the success task more attractive, however, prevents us from concluding that the questionnaire did successfully differentiate between low and high Ps Ss.

Even if the obtained Ps estimates are regarded as valid, at least two possible objections may be raised regarding the generalization of the estimates to the experimental situation: 1) the Ps values may fluctuate from time to time, and, particularly, from situation to situation; and (2) the low correlation between perceptual reasoning estimates and estimates for the other tasks may indicate that Ps estimates are very task-specific.

Regarding the first point, the questionnaires were administered by a graduate student in the relatively informal tutorial sections. The verbal and written instructions were designed, however, to make students take the situation seriously (which they appeared to do).

The experimental tasks, on the other hand, were

administered by a professor in a large room with a pre-arranged seating plan. In addition, the Ss had been specifically requested to participate in the experiment.

Despite the use of similar instructions in an attempt to create the same atmosphere in both situations, the questionnaire and experimental settings were different. It is not unlikely that some of the factors in the experimental setting served to depress initial Ps estimates relative to estimates made on the questionnaire. Another possibility is that the two situations were so different that the Ps estimates made on the questionnaires were unrelated to the initial Ps values in the task situation.

Regarding the possible task-specific property of Ps estimates, it is conceivable that a mean Ps value, obtained from several Ps estimates made by an S for different tasks, may not be representative of the individual's initial Ps in a given achievement task situation. It is possible that considerable differences in initial Ps exist within the individual for seemingly similar achievement situations.

Franham-Diggory (1966) found that children tended to indicate lower Ps values for a mental task (concept formation) than for a motor task (stringing beads). In the second chapter of this thesis, it was noted that the mean Ps estimates

for the six task descriptions differed from each other in the preliminary studies, (range of means: 49 to 64) with the mean Ps estimate for P.R. being the lowest of the six means.

Although several possible defects in the use of the Ps questionnaire have been pointed out, the uniformity in resumption choices obtained in Study I cannot be wholly attributed to the questionnaire. Weiner,⁶ has suggested that the questionnaire was ineffective in discriminating between high Ps and low Ps Ss; even if this extreme case obtained, however, some such individuals should have ended up in the experiment by chance alone. Thus, if all the other variables were being properly controlled, at least some Ss (High Ps) should have resumed the failure task. Because so few Ss actually did resume the failure task, we must consider the possible influences of other variables on resumption choices.

Task Situation

Instructions. The instruction sheets handed out to Ss at the beginning of the experimental hour were designed to arouse the achievement motive in Ss by informing them of the results of another group of students on the same experimental tasks that the Ss would be working on. In some of the

⁶ Bernard Weiner: Personal communication.

preliminary studies, Ss were also told that performance scores on the tasks were highly correlated with general academic ability. This latter statement was left out of the final form of the instructions for Studies I and II because it was felt that such information might be unduly anxiety-arousing.

The achievement-oriented instructions initially set down by Atkinson (1953), on the other hand, put great emphasis upon the importance of the experimental tasks by informing Ss that the tasks measured highly valued attributes. Although the present instructions may have checked anxiety arousal in some Ss, it is possible that the instructions were not sufficiently achievement-oriented to induce Ss' ego-involvement (i.e., engagement of the motive to achieve) in the experimental situation. Ss may not have expected to experience pride in succeeding on the puzzle tasks. Of course, if the motive to achieve was not engaged, predictions on the basis of Atkinson's model were not tested. The factor of ego-involvement in the experimental situation will be discussed later, along with the resumption task instructions and questionnaire comments.

Number of Ss. An additional situational variable might be mentioned here. Some of the previous findings on the psychological effects of success and failure were obtained when Ss were tested individually rather than in group situations

(Feather, 1961; 1963a; Weiner, 1965a; 1966). As Feather (1965) has pointed out, an S can feel somewhat anonymous in a large group of Ss (despite the fact that he is required to put his name on his work). The implication is that Ss' ego-involvement in the task is likely to be somewhat less in the group situation than in a face-to-face confrontation with E. This possibility offers further support for the notion that Ss in these two studies may not have been strongly ego-involved.

While it would be interesting to compare the results from individually-tested Ss with those obtained from group-tested Ss, certain difficulties (e.g., engagement of the motive for affiliation) are often created by the individual encounter which might constitute further uncontrolled influences on Ss' resumption choices.

Perceptual Reasoning Task

Because very little work has been carried out on the use of P.R. puzzles, specifically in an induced success-failure situation, each researcher who wishes to use the tasks must determine parameters for their use in his own experiment.

Some of the factors requiring definition include: the total number of puzzles to be used; the ratio of soluble to insoluble puzzles for both the success and failure conditions; the complexity of the puzzle designs; the amount of time to be

allowed for working on each puzzle; and the arrangement of soluble and insoluble puzzles in the booklet.

The purpose of the preliminary work carried out on the puzzles used in Studies I and II was to determine the most appropriate values of these variables for inducing success and failure experiences in Ss. Several of the many difficulties involved in determining parameters for the puzzle tasks may be considered here.

The problems of determining the optimum level of task complexity and length of working time for the puzzles are interrelated. In Studies I and II, the working time per puzzle was set at the minimum number of seconds required by the majority of Ss to complete the soluble puzzles.

During that period, however, an S working on an insoluble design might be able to attempt all or nearly all of the possible alternative solutions to the design. If this occurs, the S's Ps values should decrease rapidly for each insoluble task where he perceives no more, or very few more, remaining possible solutions (Feather, 1963c). Of course, Ss with negligible Ps values for one type of task would not be expected to resume that task.

In order to reduce the likelihood that Ss would be able to attempt most of the alternative responses within the

working time period, the complexity of the insoluble puzzles could be slightly increased. Thus, when an S fails to solve a puzzle which still presents possible alternative solutions, S might retain some expectancy of being eventually able to solve the puzzle.

An additional problem involves the arrangement of soluble and insoluble puzzles in the booklets. Feather found that final Ps values for a given task were significantly lower for Ss who experienced initial failure on the task than for Ss who experienced initial success (Feather, 1966; 1967). He concluded that initial experience on a task is a strong influence on an individual's final Ps.

Puzzle booklets for Studies I and II were arranged so that two of the first three puzzles in each booklet were soluble ones. In order to hold the effects of initial experience relatively constant for all Ss, the most appropriate number of initial puzzles on which Ss should experience uniform success (or failure) must be determined through additional research.

Further exploration concerning the number and proportion of soluble and insoluble puzzles necessary to induce success or failure experiences in individuals should be undertaken. These variables must be more strictly defined, and supporting data, such as Ss' verbal and written comments, must be obtained

before it can be safely assumed that Ss are experiencing success and failure on the puzzles.

Resumption situation

Resumption task instructions. The results of Study I reveal no differential resumption of tasks between Ss who resumed under the original resumption instructions and Ss who resumed under the relaxed resumption instructions. It will be recalled that the relaxed instructions were introduced to ensure that Ss did not infer that E wanted them to resume a particular task.

While this point may have been clarified, however, another difficulty may have been introduced (or enhanced). The new instructions may not have engaged the motive to achieve in Ss. The Ss should not necessarily expect to experience pride in working on the second group of puzzles, because E has stated: 1) that he is simply trying out some new puzzles; and 2) that the puzzles have never been used to evaluate students. If Ss believed that their performances might not be evaluated, there would be no basis for assuming that the achievement motive was engaged, and predictions regarding task resumption could not be made on the basis of Atkinson's model.

In order to ensure the ego-involvement of Ss in the resumption situation, these instructions should attempt to

enhance the importance of the tasks and to intensify Ss' expectations that their performances will be evaluated. Among college students, the test anxiety (Maf) aroused by such instructions should not be sufficient to override the influence of the achievement motive (since we have assumed that Ms is relatively stronger than Maf among these individuals).

Number of resumption decisions. The lack of variability in resumption choices obtained in both studies may have resulted, in part, from not requiring Ss to make more than one resumption choice. Such a possibility has been pointed out by Weiner⁷, who has suggested that 20 to 25 repeated choices between two tasks may be necessary to detect the differences between high and low Ps Ss. By using this method, Weiner has demonstrated differences between high and low achievers in preferences for achievement and non-achievement tasks (Weiner & Rosenbaum, 1965).

In a repeated-choice situation, the types of tasks to be used and the parameters for their use would have to be determined through preliminary studies. If two achievement tasks, such as the two types of puzzles in the present study, were to be used, particular care would have to be taken to ensure that Ps values for the failure task did not dwindle to

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Bernard Weiner: Personal communication.

ineffectual amounts during the working period, thus leading to the unanimous selection of the success task. With this precaution, the repeated-choice situation appears to be a promising modification of the present design and should clearly reveal any differences between the high and low Ps Ss.

Variation in Norm Groups

The manipulation of norm groups, undertaken in Study II, was based upon the expectancy that the use of norm groups differing in ability would result in different initial Ps values for Ss under the different norm conditions. It was expected that Ss beginning the tasks with presumably high initial Ps values would show a greater tendency to resume the failure task than Ss beginning with presumably lower initial Ps values.

Although the differences obtained in resumption choices among Ss under the three different norm conditions are quite small, the potential effect of such comparison groups upon Ps values cannot be thereby discounted. It is quite possible that one or more of the variables discussed earlier in this chapter served to nullify a norm group effect.

Further studies with norm groups of more extreme ability levels, and with variations in the reported performances of such groups, should be carried out. With the inclusion of the methodological changes suggested in this chapter, these

additional variations might be sufficient to reveal the anticipated effect upon resumption choices.

Questionnaire Comments

The following general findings resulted from examination of Ss' comments which were written after completion of the puzzle booklets. Most of the Ss apparently were not familiar with the P.R. task; approximately 70% of the 135 Ss stated that they did not have previous experience with P.R. puzzles. The majority of Ss (77%) found the puzzles to be of unequal difficulty; about 50% of these Ss specifically mentioned the difference in difficulty levels between the circle task and the square task. Most Ss, then, were aware of working on two tasks which differed considerably in difficulty.

Among the 128 Ss who chose to resume the success task, 72% reported that they were not nervous while working on the puzzles; 84% reported that nervousness did not hinder their performance.

Among the seven Ss who chose to resume the failure task, on the other hand, four Ss claimed that they were nervous, and that this nervousness hindered their performance.

Although these findings are suggestive, too few Ss resumed the failure task to determine if an actual difference in anxiety levels does exist between the two resumption groups. It is possible that some Ss who resumed the failure task were

characterized by a stronger Maf than Ms. If so, Atkinson's theory can handle their resumption decisions: Ss with high Maf are expected to find very difficult or very easy tasks less aversive than moderately difficult tasks.

Several types of answers were given in response to the question asking Ss why they chose to resume the puzzle that they did. Among Ss who resumed the success task, 63% wrote that they chose that task because it was "easier" or "easier and quicker". The decision of such a large percentage of Ss to resume the success task because it was "easier" suggests that these Ss may not have been motivated to achieve in the resumption situation; this possibility has been noted several times in the present chapter.

The remainder of the Ss choosing the success task based their resumption decision on: the greater number of successes attained on that task (17%), the interest aroused by the task or the challenge of the task. Among the seven Ss who chose to resume the failure task, four Ss said they found the task "challenging"; two Ss found it "easier", and one S gave no reason.

The Ss in both groups who based their resumption choices on the task's challenging qualities may have been ego-involved in the experiment. It is not difficult, at least, to infer

that some desire to achieve was active among these Ss. The comments from the greatest number of Ss, however, suggests a lack of ego-involvement in the experiment. It cannot, therefore, be safely assumed that the task situation did represent an achievement situation for most Ss. The hypotheses formulated in Chapters I and IV have not been tested if this is the case.

The purpose of this discussion has been to consider some of the experimental variables involved in these two studies in light of the lack of expected findings. We have pointed out the need for additional research upon: 1) the Ps questionnaire and the degree to which it differentiates between high and low Ps Ss; 2) the experimental instructions and the extent to which they are achievement-oriented; 3) the P.R. puzzles and the definition of parameters for their use in induced success and failure situations; 4) the number of resumption decisions required of Ss and the ensuing effect upon preferences between the two tasks; and 5) the use of more extreme norm groups, including variations in their reported performances on the experimental tasks.

Until much more is known about the effects and control of the experimental variables involved in these two studies, precise interpretation of any results concerning the effects

of success and failure upon individuals in achievement situations will not be possible. The planning and execution of rigorous parametric studies involving these variables appears to be the first step toward attaining more definitive results in the area.

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APPENDIX A

Ps Questionnaire

Questionnaire

For some time, university administrators have been interested in predicting success in graduate school. The tasks described in this questionnaire have been used on achievement and attitude tests designed to predict graduate school performance. Because psychologists realize that an individual's attitude may influence his task performance, they are interested in discovering how students feel about several aspects of these tasks.

In the past, graduate students have worked on certain sets of items for the different tasks described below. Past performances on these particular sets of items indicate that approximately 50% of graduate students can successfully complete each task within the time limits, and 50% fail to do so.

We want you to read the description of each task below and then to indicate: 1) what you expect YOUR chances of success would be for each set of items attempted by graduate students in the past and 2) how you would feel about working at such a task.

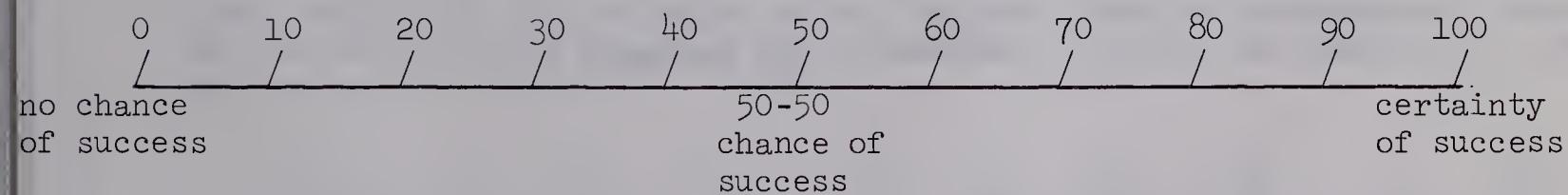
A rating scale, ranging from 0 to 100, is provided after each task description. Estimate your chances of successfully completing the set of items for each task as so many chances in 100 on the scale. In other words, use the scale to indicate how confident you are that you could successfully complete the items for each kind of task. Then, to indicate your feeling about working on such a task, place a check mark before either the like, dislike or neutral categories.

XXXXXXXXXXXX

Example: The following task is only an example; norms for graduate students have not been established for this sample task.

The task is to roll marbles between two blocks. The difficulty level of this task is varied by decreasing the distance between the two blocks, and by increasing the subject's distance from the blocks.

On the following scale, indicate your chances of success for the particular set of items composing this task that is passed by 50% of graduate students. Circle the appropriate number on the scale.



Indicate how you would feel about working on this task:

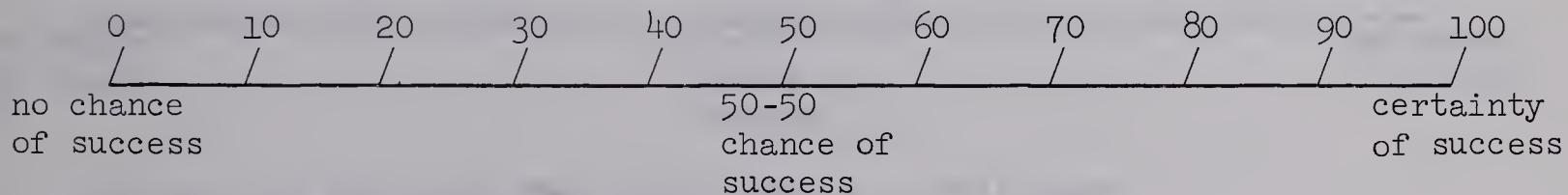
 LIKE DISLIKE NEUTRAL

Normative data has been collected on the following six tasks and indicate that approximately 50% of graduate students can successfully complete each task within the time limits.

Task I: digit substitution.

Each number (digit) from 1-9 is paired with a different geometric figure (symbol). The geometric symbols and corresponding digits are presented at the beginning of the task. Following this are several rows of numbers only, with a space above each number. The task is to substitute (write in) the symbol corresponding to each number within the time limit. Item difficulty can be varied by increasing or decreasing the amount of time allowed for the substitution.

On the basis of past results, psychologists have compiled a set of digit substitution items which approximately 50% of graduate students can successfully complete within the time limits. On the following scale, indicate what you believe your chances for success are for this compiled set of digit substitution items. Circle the appropriate number on the scale.



Indicate how you would feel about working on this task:

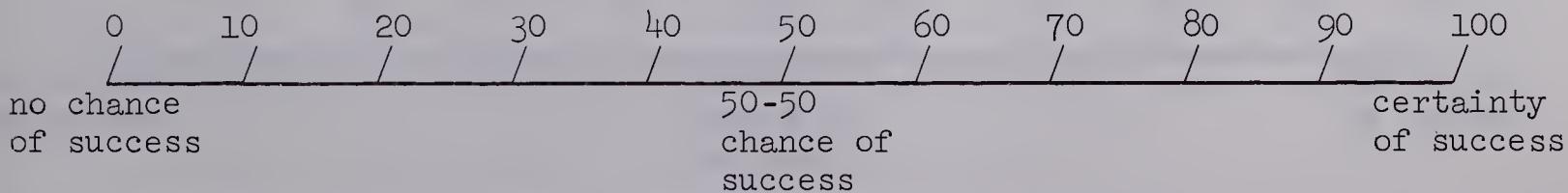
 LIKE DISLIKE NEUTRAL

xxxxxxxx

Task II: anagrams.

Each item consists of a group of scrambled letters. The task is to unscramble or rearrange the letters to form a common English word for each item. Difficulty is varied by increasing or decreasing the length of words to be rearranged.

On the basis of past results, psychologists have compiled a set of anagrams which approximately 50% of graduate students can successfully complete within the time limits. On the following scale, indicate what you believe your chances for success are for this compiled set of anagrams. Circle the appropriate number on the scale.



Indicate how you would feel about working on this task:

 LIKE DISLIKE NEUTRAL

3.

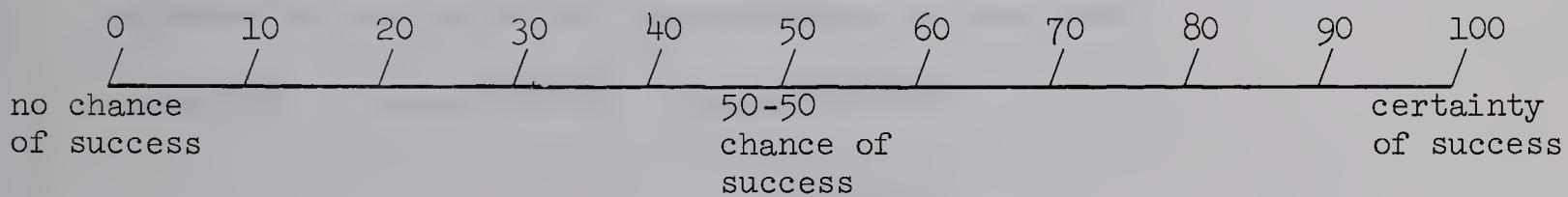
Task III: analogies.

Two words that are related to each other in a certain way are presented. Along with these two words is presented a third unrelated word. The words are given in the form:

Word A : Word B as Word C :

The above is read: Word A is related to Word B in the same way that Word C is related to _____. The task is to fill in the appropriate word in the blank. Difficulty is varied by increasing or decreasing the subtlety of the relationships.

On the basis of past results, psychologists have compiled a set of analogies which approximately 50% of graduate students can successfully complete within the time limits. On the following scale, indicate what you believe your chances for success are for this compiled set of analogies. Circle the appropriate number on the scale.



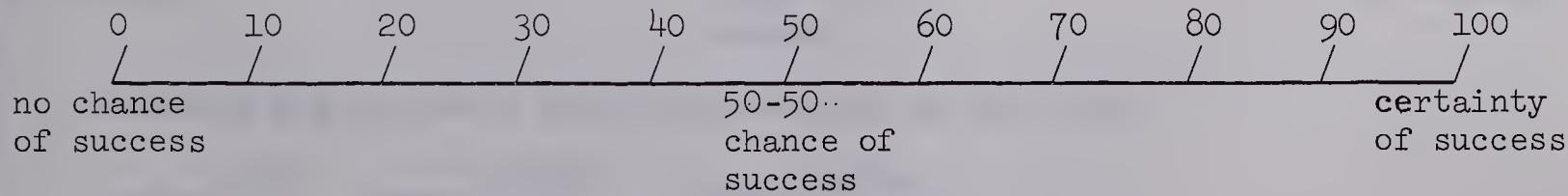
Indicate how you would feel about working on this task:

XXXXXXXXXXXX

Task IV: perceptual reasoning.

The items in this test consist of complex geometrical figures. The task is to trace over every line of a figure without lifting the pencil or tracing over any line more than once. Difficulty is varied by manipulating complexity of the figure to be traced.

On the basis of past results, psychologists have compiled a set of perceptual reasoning items which approximately 50% of graduate students can successfully complete within the time limits. On the following scale, indicate what you believe your chances for success are for this compiled set of perceptual reasoning items. Circle the appropriate number on the scale.



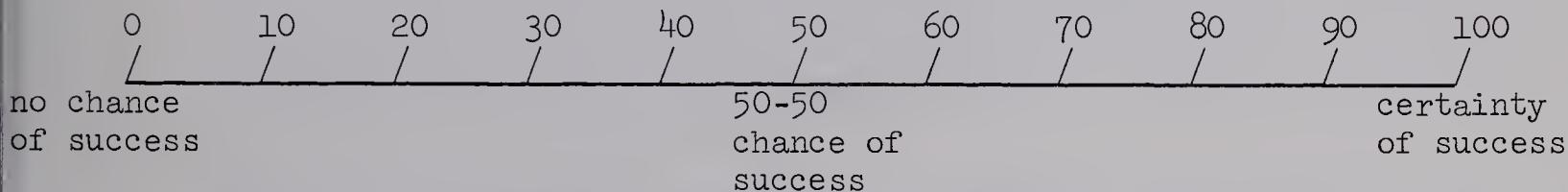
Indicate how you would feel about working on this task:

LIKE DISLIKE NEUTRAL

Task V: scrambled sentences.

A group of words in a scrambled arrangement is presented for each item. The task is to rearrange the words so they form a good sentence. Difficulty is varied by manipulating length of the sentences.

On the basis of past results, psychologists have compiled a set of scrambled sentences which approximately 50% of graduate students can successfully complete within the time limits. On the following scale, indicate what you believe your chances for success are for this compiled set of scrambled sentences. Circle the appropriate number on the scale.



Indicate how you would feel about working on this task:

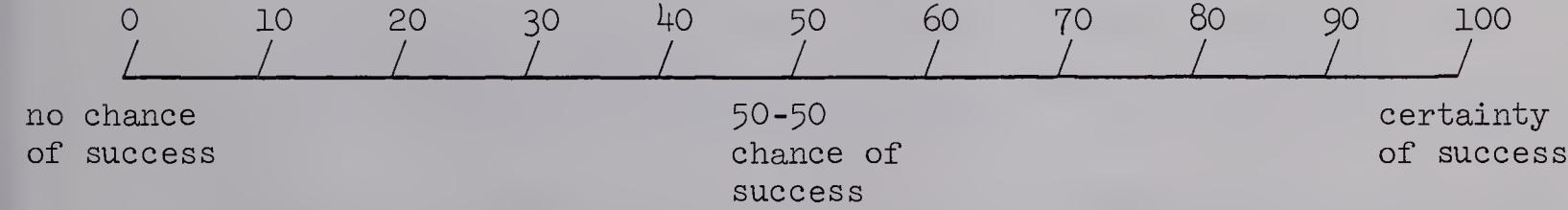
 LIKE DISLIKE NEUTRAL

xxxxxxxx

Task VI: number series.

A series of numbers bearing a certain relationship to each other is presented. A blank space appears in the series where one number has been intentionally omitted. The task is to discover the relationships among the numbers and then to fill in the appropriate number in the blank space. Difficulty is varied by manipulating the complexity of the relationships among the numbers.

On the basis of past results, psychologists have compiled number series items which approximately 50% of graduate students can successfully complete within the time limits. On the following scale, indicate what you believe your chances for success are for this compiled set of number series items. Circle the appropriate number on the scale.



Indicate how you would feel about working on this task:

 LIKE DISLIKE NEUTRAL

APPENDIX B

Instructions for Experimental Task and Sample Task Designs

Instructions

The envelope which you have been given contains a booklet of geometric puzzles. Remove the booklet from the envelope but do not open the booklet until instructed to do so. Please print your name on the front page of the booklet.

The 20 puzzles in your booklet comprise a test of Perceptual Reasoning Ability. This Perceptual Reasoning test has been used to evaluate high school students in the past; their performance norms indicate that just about 50% of high school students are able to complete these puzzles successfully within the time limits. We want to see how well you can do on the same puzzles.

Your task is to trace every line of a geometric figure according to the following rules:

1. You may not lift your pencil during the tracing.
2. You must trace over every line segment in the figure.
3. You may not trace over any line more than once.
4. You may not cross over a line that has already been traced.

You will have 30 seconds to trace each figure. If you successfully complete a puzzle, place a plus mark in the box provided at the top of each page in the booklet. If you fail to complete a puzzle, place a minus mark in the box. Do not go on to the next puzzle until directed to do so.

All tracing is to be done on the tracing paper provided. If you make an error, you may start over on another square of tracing paper, but the figure must be traced within the initial 30 second period for that puzzle to count. After you finish tracing an item, remove the tracing paper from the booklet and place it in a pile in front of you. Place all completed and incompletely traced items in the same pile; make sure that you keep them in the same order in which you have worked on them.

Remember:

1. Trace over the entire puzzle without lifting your pencil or using any line more than once.
2. Place a plus or minus mark on the page when you finish with a puzzle.
3. Keep all tracings together and in order.

When the experimenter says "Begin", open the puzzle booklet to the first puzzle and begin tracing. After 30 seconds, he will say "Stop tracing. Mark either a plus or minus for this puzzle." Wait until he directs you to begin the next puzzle.

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The envelope which you have been given contains a booklet of geometric puzzles. Remove the booklet from the envelope but do not open the booklet until instructed to do so. Please print your name on the front page of the booklet.

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Your task is to trace every line of a geometric figure according to the following rules:

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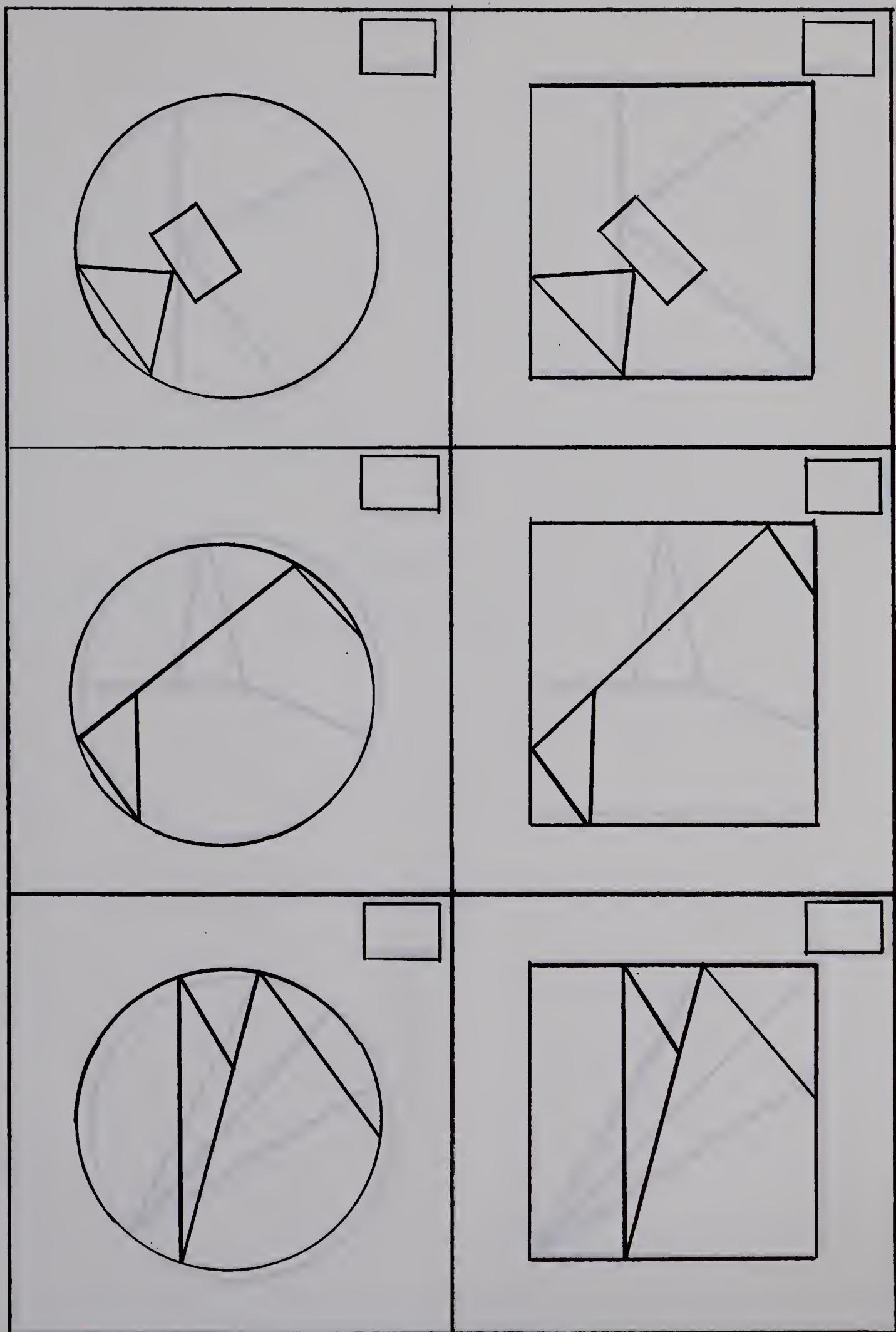
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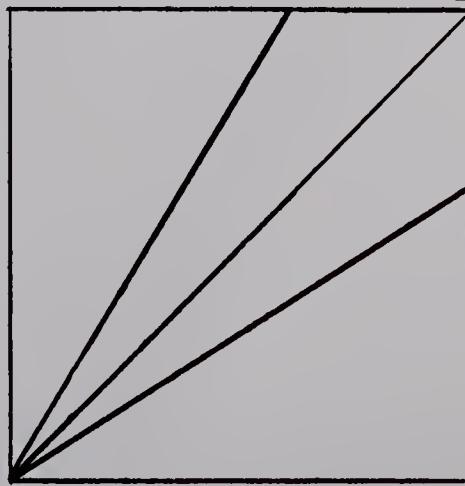
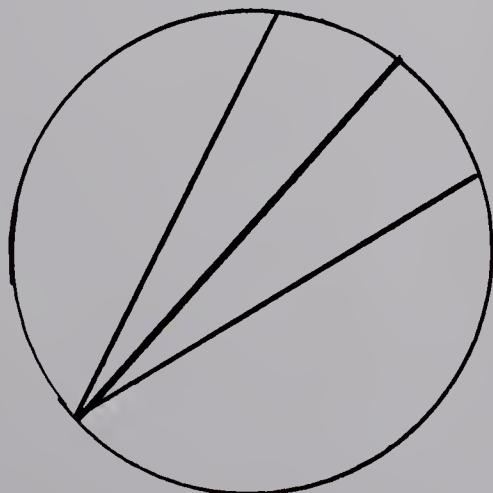
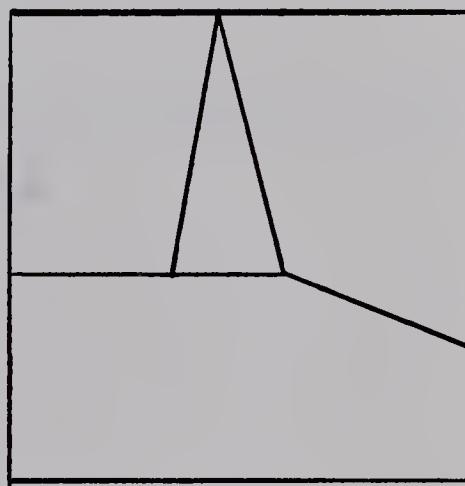
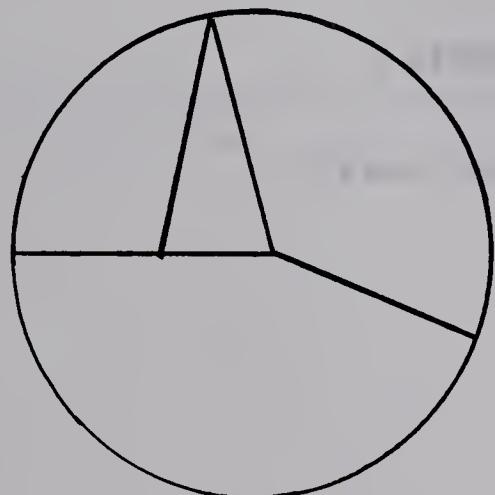
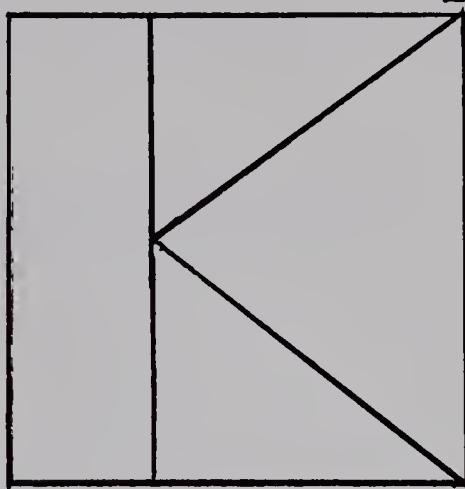
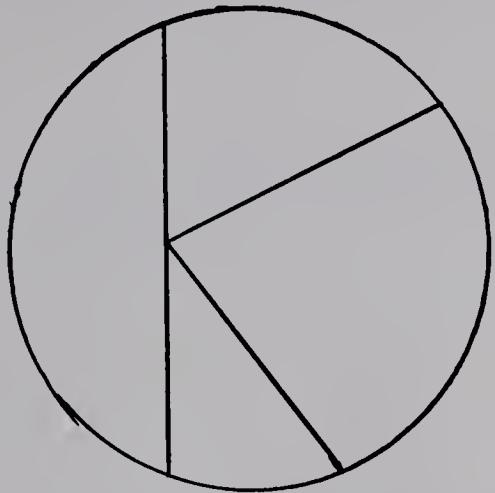
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APPENDIX C

Final Questionnaire

1. Have you worked on perceptual reasoning puzzles in the past?
2. Did you find the puzzles fairly equal in difficulty? Please explain.
3. Were you nervous about working on the puzzles during the experiment? Did such feelings impair your performance?
4. Why did you choose to continue with the particular puzzle that you did?

помощи для выживания в условиях кризиса. Но помощь не должна

превратиться в чисто гуманитарную или даже в чисто социальную помощь

— заявил министр национальной политики и культуры Франции Жан-Жак Амаду Симоне. Тогда «Банде аудиомари» тоже под «Банде аудиомари»

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